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111

SEQUENCE LISTING

<110> International Flower Developments Pty Ltd

<120> Genetic sequences encoding flavonoid pathway enzymes
and uses therefor

<130> 2088133

<140> 09/142108

<141> 1997-02-28

<150> PN8386

<151> 1996-03-01

<160> 41

<170> PatentIn Ver. 2.1

<210> 1

<211> 1789

<212> DNA

<213> Petunia x hybrida

<220>

<221> CDS

<222> (50)..(1588)

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Gly Pro Lys Pro Trp Pro Ile Ile Gly Asn Leu Val His Leu Gly Pro
40 45 50

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Arg Pro Pro Asn Ser Gly Ala Glu His Met Ala Tyr Asn Tyr Gln Asp			
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ctt gtt ttt gca cct tat gga cct aga tgg cgt atg ctt agg aaa att			442
Leu Val Phe Ala Pro Tyr Gly Pro Arg Trp Arg Met Leu Arg Lys Ile			
120	125	130	
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Cys Ser Val His Leu Phe Ser Thr Lys Ala Leu Asp Asp Phe Arg His			
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Val Arg Gln Asp Glu Val Lys Thr Leu Thr Arg Ala Leu Ala Ser Ala			
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Lys Gly Lys Ile Phe Gly Glu Met Lys Asp Leu Leu Ser Thr Leu Ile			
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420	425	430	435
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440	445	450	
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455	460	465	
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Phe Asn Trp Asp Leu Val Ser Gly Gln Leu Pro Glu Met Leu Asn Met			
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Glu Glu Ala Tyr Gly Leu Thr Leu Gln Arg Ala Asp Pro Leu Val Val
485 490 495

cac cca agg cct cgc tta gaa gcc caa gc^g tac att ggg tga 1588
His Pro Arg Pro Arg Leu Glu Ala Gln Ala Tyr Ile Gly
500 505 510

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agtttgttta tgctttggat ttagtagtt ttatattgat agatcaatgt ttgcattgtc 1708
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<213> Petunia x hybrida

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35 40 45
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50 55 60
Gly Pro Leu Met Tyr Leu Lys Met Gly Phe Val Asp Val Val Val Ala
65 70 75 80
Ala Ser Ala Ser Val Ala Ala Gln Phe Leu Lys Thr His Asp Ala Asn
85 90 95
Phe Ser Ser Arg Pro Pro Asn Ser Gly Ala Glu His Met Ala Tyr Asn
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Tyr Gln Asp Leu Val Phe Ala Pro Tyr Gly Pro Arg Trp Arg Met Leu
115 120 125
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130 135 140
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165 170 175
Cys Thr Thr Asn Ala Leu Ala Arg Val Met Leu Gly Lys Arg Val Phe
180 185 190
Ala Asp Gly Ser Gly Asp Val Asp Pro Gln Ala Ala Glu Phe Lys Ser
195 200 205
Met Val Val Glu Met Met Val Val Ala Gly Val Phe Asn Ile Gly Asp
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	450					455			460						
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Glu Glu His Lys Ser Val Ala His Gln Gln Asn Gly Gly Asp Leu Leu			
245	250	255	
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260	265	270	
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470	475	480	
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 Asp Asp Phe Arg Leu Val Arg Gln Glu Glu Val Ser Ile Leu Val Asn
 130 135 140
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 145 150 155 160
 Asn Val Cys Thr Thr Asn Ala Leu Ser Arg Val Met Leu Gly Lys Arg
 165 170 175
 Val Leu Gly Asp Gly Thr Gly Lys Ser Asp Pro Lys Ala Glu Glu Phe
 180 185 190
 Lys Asp Met Val Leu Glu Leu Met Val Leu Thr Gly Val Phe Asn Ile
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 Gly Asp Phe Val Pro Ala Leu Glu Cys Leu Asp Leu Gln Gly Val Ala
 210 215 220
 Ser Lys Met Lys Lys Leu His Lys Arg Leu Asp Asn Phe Met Ser Asn
 225 230 235 240
 Ile Leu Glu Glu His Lys Ser Val Ala His Gln Gln Asn Gly Gly Asp
 245 250 255
 Leu Leu Ser Ile Leu Ile Ser Leu Lys Asp Asn Cys Asp Gly Glu Gly
 260 265 270
 Gly Lys Phe Ser Ala Thr Glu Ile Lys Ala Leu Leu Asp Leu Phe
 275 280 285
 Thr Ala Gly Thr Asp Thr Ser Ser Ser Thr Thr Glu Trp Ala Ile Ala
 290 295 300
 Glu Leu Ile Arg His Pro Lys Ile Leu Ala Gln Val Gln Gln Glu Met
 305 310 315 320
 Asp Ser Val Val Gly Arg Asp Arg Leu Ile Ala Glu Ala Asp Ile Pro
 325 330 335
 Asn Leu Thr Tyr Phe Gln Ala Val Ile Lys Glu Val Phe Arg Leu His
 340 345 350
 Pro Ser Thr Pro Leu Ser Leu Pro Arg Val Ala Asn Glu Ser Cys Glu
 355 360 365
 Ile Asn Gly Tyr His Ile Pro Lys Asn Thr Thr Leu Leu Val Asn Val
 370 375 380
 Trp Ala Ile Ala Arg Asp Pro Glu Val Trp Ala Asp Pro Leu Glu Phe
 385 390 395 400
 Lys Pro Glu Arg Phe Leu Pro Gly Gly Glu Lys Pro Asn Val Asp Val
 405 410 415
 Lys Gly Asn Asp Phe Glu Leu Ile Pro Phe Gly Ala Gly Arg Arg Ile
 420 425 430
 Cys Ala Gly Leu Ser Leu Gly Leu Arg Met Val Gln Leu Met Thr Ala
 435 440 445
 Thr Leu Ala His Thr Tyr Asp Trp Ala Leu Ala Asp Gly Leu Met Pro
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 <222> (91)..(1629)

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 Phe Ile Leu Gly Phe Leu Leu Tyr Ser Phe Leu Asn Lys Lys Val
 25 30 35 40

aag cca ctg cca cct gga ccg aag cca tgg ccc atc gtc gga aat ctg 258
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 45 50 55

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 60 65 70

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Val Glu Leu Met Val Leu Ala Gly Val Phe Asn Leu Gly Asp Phe Ile		
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Pro Pro Leu Glu Lys Leu Asp Leu Gln Gly Val Ile Ala Lys Met Lys		
235	240	245
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Lys Leu His Leu Arg Phe Asp Ser Phe Leu Ser Lys Ile Leu Gly Asp		
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His Lys Ile Asn Ser Ser Asp Glu Thr Lys Gly His Ser Asp Leu Leu		
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275	280	
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Leu Thr Asp Val Glu Ile Lys Ala Leu Leu Leu Asn Leu Phe Ala Ala		
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305	310	
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355	360	

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Gly Tyr Leu Ile Pro Lys Gly Ser Thr Leu Leu Val Asn Val Trp Ala		
395	400	405
att gct cgc gat cca aat gtg tgg gat gaa cca cta gag ttc cgg cct		1362
Ile Ala Arg Asp Pro Asn Val Trp Asp Glu Pro Leu Glu Phe Arg Pro		
410	415	420
gaa cga ttc ttg aag ggc ggg gaa aag cct aat gtc gat gtt aga ggg		1410
Glu Arg Phe Leu Lys Gly Gly Glu Lys Pro Asn Val Asp Val Arg Gly		
425	430	435
aat gat ttc gaa ttg ata ccg ttc gga gcg ggc cga aga att tgt gca		1458
Asn Asp Phe Glu Leu Ile Pro Phe Gly Ala Gly Arg Arg Ile Cys Ala		
445	450	455
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Gly Met Ser Leu Gly Ile Arg Met Val Gln Leu Leu Thr Ala Thr Leu		
460	465	470
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Asn His Ala Phe Asp Phe Asp Leu Ala Asp Gly Gln Leu Pro Glu Ser		
475	480	485
tta aac atg gag gaa gct tat ggg ctg acc ttgcaa cga gct gac cct		1602
Leu Asn Met Glu Glu Ala Tyr Gly Leu Thr Leu Gln Arg Ala Asp Pro		
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 Glu Lys Phe Leu Lys Val His Asp Ala Asn Phe Ser Ser Arg Pro Pro
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 Asn Ser Gly Ala Lys His Val Ala Tyr Asn Tyr Gln Asp Leu Val Phe
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 Ala Pro Tyr Gly Pro Arg Trp Arg Met Leu Arg Lys Ile Cys Ala Leu
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 Asp Glu Val Gly Ile Leu Thr Arg Val Leu Ala Asp Ala Gly Glu Thr
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 Ala Arg Val Met Leu Gly Arg Arg Val Val Gly His Ala Asp Ser Lys
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 Ala Glu Glu Phe Lys Ala Met Val Val Glu Leu Met Val Leu Ala Gly
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 Val Phe Asn Leu Gly Asp Phe Ile Pro Pro Leu Glu Lys Leu Asp Leu
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 Gln Gly Val Ile Ala Lys Met Lys Lys Leu His Leu Arg Phe Asp Ser
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 Phe Leu Ser Lys Ile Leu Gly Asp His Lys Ile Asn Ser Ser Asp Glu
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 Thr Lys Gly His Ser Asp Leu Leu Asn Met Leu Ile Ser Leu Lys Asp
 275 280 285
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 305 310 315 320
 Val Glu Trp Cys Ile Ala Glu Leu Val Arg His Pro Glu Ile Leu Ala
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 Gln Val Gln Lys Glu Leu Asp Ser Val Val Gly Lys Asn Arg Val Val
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 Lys Glu Ala Asp Leu Ala Gly Leu Pro Phe Leu Gln Ala Val Val Lys
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 Glu Asn Phe Arg Leu His Pro Ser Thr Pro Leu Ser Leu Pro Arg Ile
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 Thr Leu Leu Val Asn Val Trp Ala Ile Ala Arg Asp Pro Asn Val Trp
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Lys	Pro	Asn	Val	Asp	Val	Arg	Gly	Asn	Asp	Phe	Glu	Leu	Ile	Pro	Phe
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Gly	Ala	Gly	Arg	Arg	Ile	Cys	Ala	Gly	Met	Ser	Leu	Gly	Ile	Arg	Met
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Val	Gln	Leu	Leu	Thr	Ala	Thr	Leu	Asn	His	Ala	Phe	Asp	Phe	Asp	Leu
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Asp Val Lys Gly Ser Asp Phe Glu Leu Ile Pro Phe Gly Ala Gly Arg		
165	170	175
cca atc tgt gca ggt tta agt tta ggg cta cgt aca gat tta agt tgc		576
Pro Ile Cys Ala Gly Leu Ser Leu Gly Leu Arg Thr Asp Leu Ser Cys		
180	185	190
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Leu His Ala Asn Val Ala His Lys His Leu Ile Gly Asn Phe Ser Trp		
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Arg Ser Tyr Ala Gly Gln Pro Glu Tyr Arg Arg Lys Ser Leu Leu Gly		
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Phe Thr Leu Gln Arg Ala Val Pro Ser Val Val His Pro Lys Pro Arg		
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240		
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gct tct tgg aca agg tat atg gct tgc acg aaa cta acg ttt taa		813
Ala Ser Trp Thr Arg Tyr Met Ala Cys Thr Lys Leu Thr Phe		
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Ala Leu Leu Leu

145

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cactctc当地 atggctggcc attccagtaa gaactctcac tgatcttctt cacctttgtt	4817
tatggatttg gtctctc当地 ctcactctcg cttacccttt cacattcagc tctggctc	4877
tggtaaaga aacccttaat ctacaaagct tgcttc当地 gcaaatttgaac taccttactt	4937
atctctttag caactcttgc tgatgatttg caaacatctt aacctctc当地 aacaagattt	4997
acaaatctt cttggcttc当地 ttacaatttt gttcccattt ttttcttctt tgtaggtgc	5057
ctcatgggtgt gtgtgaaaa cagggtgag tgactc当地 ctacaaaaga cattagacta	5117
tgcttgc当地 aatggagctg actgtaccc aactcaccca aaaggcttctt gcttcaatcc	5177

tgacaatgtt	agggctcatt	gcaactatgc	agtcaaatgc	ttcttccaaa	agaaaggta	5237
agcttctgag	tcttctaact	tcactggcac	tgccactctt	accaccacccg	atcccagtaa	5297
gtttcagaa	tgttaaacact	cttgtatct	ttagaaccct	acaaaattt	gagtctaga	5357
aagttcaagt	tcaaggctt	ttggtagag	tactaaagat	tcaagtagag	actaggcgtg	5417
agatattttt	tctctgatgt	gtgatttttt	ggcacaggct	atacaggatg	tgcattccct	5477
tctagtgcta	ggtacggctc	tttgcttctc	tacacattta	ttttcttaat	ggctttatct	5537
agaactttga	aggataaccat	tttatttttt	ttggacaaag	aaggatagcc	attnaatact	5597
acactttaat	gttggattaa	ctaacttatt	atgcctattt	aatggcctac	actttaagtg	5657
gacacaagct	tgatttggtt	ataaaaaaaag	tgcactataa	tcttatttta	ctgaaccctt	5717
ttttctatga	ttttttact	aaactttaga	taacatctac	aacaattcaa	ttgccttttt	5777
ttggggattt	tataagtttg	aacctatggt	tagtgtattt	acttgcgcgt	ctcttattgc	5837
aacggttctt	tgaaaacaca	ttaatgataa	ataaattgaa	aagtatagag	atggcaattt	5897
tttcaaaagc	taatcttct	gcttgctaatt	actttacata	aaaaacaaaa	aattaagaag	5957
atttcaaaac	aatacaactt	tttaccttg	tcctaacaaa	ttcaactcaa	atgacatgtg	6017
tttgctttaa	aatagtaaca	actgtaaatt	cattgctct	tgagacataa	gtgcaagcta	6077
aagataaaacg	caagcaatac	aattaggcct	aattaagatt	acgaatattt	ttgtttgttt	6137
atagtggttc	tagtggaaagc	ggtagcacca	ccgtgacgcc	aggaaaaac	agtccaaaag	6197
gaagcaacag	catcaccaca	tttcccgccg	gaaacagtcc	atacactggc	acaccatcca	6257
ccggattatt	aggaggcaat	atcaactgatg	caactggAAC	cgggttgaac	ccggattact	6317
caaccgaaag	cagtggattt	gcgctctatt	actccaacaa	ccttctgtta	accggctttt	6377
gttctctcg	gatgatgctc	tgaagaagaa	tcaccgtctt	cttttagttt	atgcttagtc	6437
aaaaaaaaat	gttatttata	tgttcttgg	gttttagaga	taatttaatc	tggatttcgg	6497
ttctttttta	cttccgggtt	ttaagaaaac	aattatcaat	gtaaaaccaa	atctactatc	6557
gatcggtttt	gtacgaattc	ctgcagcccc	ggggatcc			6595

<210> 10
 <211> 150
 <212> PRT
 <213> *Arabidopsis thaliana*

<400> 10
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 1 5 10 15

 Ile Leu Arg Ile Phe Ser His Arg Arg Asn Arg Ser His Asn Asn Arg
 20 25 30

 Leu Pro Pro Gly Pro Asn Pro Trp Pro Ile Ile Gly Asn Leu Pro His
 35 40 45

 Met Gly Thr Lys Pro His Arg Thr Leu Ser Ala Met Val Thr Thr Tyr
 50 55 60

 Gly Pro Ile Leu His Leu Arg Leu Gly Phe Val Asp Val Val Val Ala
 65 70 75 80

 Ala Ser Lys Ser Val Ala Glu Gln Phe Leu Lys Ile His Asp Ala Asn
 85 90 95

 Phe Ala Ser Arg Pro Pro Asn Ser Gly Ala Lys His Met Ala Tyr Asn
 100 105 110

 Tyr Gln Asp Leu Val Phe Ala Pro Tyr Gly His Arg Trp Arg Leu Leu
 115 120 125

 Arg Lys Ile Ser Ser Val His Leu Phe Ser Ala Lys Ala Leu Glu Asp
 130 135 140

 Phe Lys His Val Arg Gln
 145 150

<210> 11
 <211> 147
 <212> PRT
 <213> *Arabidopsis thaliana*

<400> 11
 Glu Glu Val Gly Thr Leu Thr Arg Glu Leu Val Arg Val Gly Thr Lys
 1 5 10 15

 Pro Val Asn Leu Gly Gln Leu Val Asn Met Cys Val Val Asn Ala Leu
 20 25 30

 Gly Arg Glu Met Ile Gly Arg Arg Leu Phe Gly Ala Asp Ala Asp His
 35 40 45

 Lys Ala Asp Glu Phe Arg Ser Met Val Thr Glu Met Met Ala Leu Ala
 50 55 60

 Gly Val Phe Asn Ile Gly Asp Phe Val Pro Ser Leu Asp Trp Leu Asp
 65 70 75 80

Leu Gln Gly Val Ala Gly Lys Met Lys Arg Leu His Lys Arg Phe Asp
85 90 95

Ala Phe Leu Ser Ser Ile Leu Lys Glu His Glu Met Asn Gly Gln Asp
100 105 110

Gln Lys His Thr Asp Met Leu Ser Thr Leu Ile Ser Leu Lys Gly Thr
115 120 125

Asp Leu Asp Gly Asp Gly Ser Leu Thr Asp Thr Glu Ile Lys Ala
130 135 140

Leu Leu Leu
145

<210> 12

<211> 57

<212> PRT

<213> Arabidopsis thaliana

<400> 12

Asn Met Phe Thr Ala Gly Thr Asp Thr Ser Ala Ser Thr Val Asp Trp
1 5 10 15

Ala Ile Ala Glu Leu Ile Arg His Pro Asp Ile Met Val Lys Ala Gln
20 25 30

Glu Glu Leu Asp Ile Val Val Gly Arg Asp Arg Pro Val Asn Glu Ser
35 40 45

Asp Ile Ala Gln Leu Pro Tyr Leu Gln
50 55

<210> 13

<211> 159

<212> PRT

<213> Arabidopsis thaliana

<400> 13

Ala Val Ile Lys Glu Asn Phe Arg Leu His Pro Pro Thr Pro Leu Ser
1 5 10 15

Leu Pro His Ile Ala Ser Glu Ser Cys Glu Ile Asn Gly Tyr His Ile
20 25 30

Pro Lys Gly Ser Thr Leu Leu Thr Asn Ile Trp Ala Ile Ala Arg Asp
35 40 45

Pro Asp Gln Trp Ser Asp Pro Leu Ala Phe Lys Pro Glu Arg Phe Leu
50 55 60

Pro Gly Gly Glu Lys Ser Gly Val Asp Val Lys Gly Ser Asp Phe Glu
65 70 75 80

Leu Ile Pro Phe Gly Ala Gly Arg Arg Ile Cys Ala Gly Leu Ser Leu
85 90 95

Gly Leu Arg Thr Ile Gln Phe Leu Thr Ala Thr Leu Val Gln Gly Phe
100 105 110

Asp Trp Glu Leu Ala Gly Gly Val Thr Pro Glu Lys Leu Asn Met Glu
115 120 125

Glu Ser Tyr Gly Leu Thr Leu Gln Arg Ala Val Pro Leu Val Val His
130 135 140

Pro Lys Pro Arg Leu Ala Pro Asn Val Tyr Gly Leu Gly Ser Gly
145 150 155

<210> 14
<211> 1748
<212> DNA
<213> Rosa hybrida

<220>
<221> CDS
<222> (22)..(1563)

<400> 14
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Met Phe Leu Ile Val Val Ile Thr Phe Leu
1 5 10

tgc gcc gtg ttt ttg ttc cgg ctt ctt ttc tcc ggc aaa tcc caa cgc 99
Phe Ala Val Phe Leu Phe Arg Leu Leu Phe Ser Gly Lys Ser Gln Arg
15 20 25

cac tcg ctc cct ctc cct cct ggc ccc aaa cca tgg ccg gtg gtt ggc 147
His Ser Leu Pro Leu Pro Pro Gly Pro Lys Pro Trp Pro Val Val Gly
30 35 40

aac tta cct cac ttg ggc ccc ttc ccg cac cac tcc atc gcg gag ttg 195
Asn Leu Pro His Leu Gly Pro Phe Pro His His Ser Ile Ala Glu Leu
45 50 55

gcg aag aaa cac ggg ccg ctc atg cac ctc cgc ctc ggc tac gtt gac 243
Ala Lys Lys His Gly Pro Leu Met His Leu Arg Leu Gly Tyr Val Asp
60 65 70

gta gtc gtg gcg gca tca gca tcc gta gcg gcc cag ttc ttg aag act 291

Val Val Val Ala Ala Ser Ala Ser Val Ala Ala Gln Phe Leu Lys Thr			
75	80	85	90
cac gac gcc aat ttc tcc agc cga ccg ccc aac tcc ggc gcc aag cac			339
His Asp Ala Asn Phe Ser Ser Arg Pro Pro Asn Ser Gly Ala Lys His			
95	100	105	
ctc gcc tat aac tac cag gac ctc gtg ttc agg ccg tac ggt cca ccg			387
Leu Ala Tyr Asn Tyr Gln Asp Leu Val Phe Arg Pro Tyr Gly Pro Arg			
110	115	120	
tgg cgc atg ttc cg ^g aag atc agc tcc gtc cat ctg ttc tcc ggc aaa			435
Trp Arg Met Phe Arg Lys Ile Ser Ser Val His Leu Phe Ser Gly Lys			
125	130	135	
gcc ttg gat gat ctt aaa cac gtc ccg cag gag gag gta agt gtg cta			483
Ala Leu Asp Asp Leu Lys His Val Arg Gln Glu Glu Val Ser Val Leu			
140	145	150	
g ^c cat gcc ttg gca aat tca ggg tca aag gta gtg aac ctg g ^c caa			531
Ala His Ala Leu Ala Asn Ser Gly Ser Lys Val Val Asn Leu Ala Gln			
155	160	165	170
ctg ctg aac ctg tgc acg gtc aat gct cta gga agg gtg atg gta ggg			579
Leu Leu Asn Leu Cys Thr Val Asn Ala Leu Gly Arg Val Met Val Gly			
175	180	185	
cgg agg gtt ttc ggc gac ggc agc gga ggc gac gat ccg aag g ^c gac			627
Arg Arg Val Phe Gly Asp Gly Ser Gly Asp Asp Pro Lys Ala Asp			
190	195	200	
gag ttc aaa tcg atg gtg gtg gag atg atg gtg ttg gca gga gtg ttc			675
Glu Phe Lys Ser Met Val Val Glu Met Met Val Leu Ala Gly Val Phe			
205	210	215	
aac ata ggt gac ttc atc ccc tct ctc gaa tgg ctt gac ttg caa ggc			723
Asn Ile Gly Asp Phe Ile Pro Ser Leu Glu Trp Leu Asp Leu Gln Gly			
220	225	230	
gtg g ^c tcc aag atg aag aag ctc cac aag aga ttc gac gac ttc ttg			771
Val Ala Ser Lys Met Lys Lys Leu His Lys Arg Phe Asp Asp Phe Leu			
235	240	245	250
aca gcc att gtc gag gac cac aag aag ggc tcc ggc acg g ^c ggg cac			819
Thr Ala Ile Val Glu Asp His Lys Lys Gly Ser Gly Thr Ala Gly His			
255	260	265	
gtc gac atg ttg acc act ctg ctc tcg ctc aag gaa gac g ^c gac ggc			867
Val Asp Met Leu Thr Thr Leu Leu Ser Leu Lys Glu Asp Ala Asp Gly			
270	275	280	
gaa gga ggc aag ctc acc gat act gaa atc aaa gct ttg ctt ttg aac			915
Glu Gly Gly Lys Leu Thr Asp Thr Glu Ile Lys Ala Leu Leu Asn			
285	290	295	

atg ttc acg gct ggc act gat acg tca tcg agc acg gtg gaa tgg gca		963
Met Phe Thr Ala Gly Thr Asp Thr Ser Ser Ser Thr Val Glu Trp Ala		
300	305	310
ata gct gaa ctc att cgg cac cct cat atg cta gcg cga gtt cag aaa		1011
Ile Ala Glu Leu Ile Arg His Pro His Met Leu Ala Arg Val Gln Lys		
315	320	325
330		
gag ctt gac gat ttt gtt ggc cat gac cga ctt gtg acc gaa tcc gac		1059
Glu Leu Asp Asp Phe Val Gly His Asp Arg Leu Val Thr Glu Ser Asp		
335	340	345
ata ccc aac ctc cct tac ctc caa gcc gtg atc aag gaa acg ttc cga		1107
Ile Pro Asn Leu Pro Tyr Leu Gln Ala Val Ile Lys Glu Thr Phe Arg		
350	355	360
ctc cac cca tcc act cct ctc tcg ttg cct cgt atg gca gcc gag agt		1155
Leu His Pro Ser Thr Pro Leu Ser Leu Pro Arg Met Ala Ala Glu Ser		
365	370	375
tgc gaa atc aac ggg tac cac atc ccg aaa ggc tcc aca ctc ttg gtc		1203
Cys Glu Ile Asn Gly Tyr His Ile Pro Lys Gly Ser Thr Leu Leu Val		
380	385	390
aat gta tgg gcc ata tcg cgt gac ccg gct gaa tgg gcc gac cca ctg		1251
Asn Val Trp Ala Ile Ser Arg Asp Pro Ala Glu Trp Ala Asp Pro Leu		
395	400	405
410		
gag ttc aag ccc gag agg ttc ctg ccg ggg ggc gaa aag cct aat gtt		1299
Glu Phe Lys Pro Glu Arg Phe Leu Pro Gly Gly Glu Lys Pro Asn Val		
415	420	425
gat att aga gga aac gat ttt gaa gtc ata ccc ttc ggt gcc ggg cga		1347
Asp Ile Arg Gly Asn Asp Phe Glu Val Ile Pro Phe Gly Ala Gly Arg		
430	435	440
aga ata tgt gcc ggg atg agc ttg ggc ctg cgt atg gtc cat tta atg		1395
Arg Ile Cys Ala Gly Met Ser Leu Gly Leu Arg Met Val His Leu Met		
445	450	455
act gca aca ttg gtc cac gca ttt aat tgg gcc ttg gct gat ggg ctg		1443
Thr Ala Thr Leu Val His Ala Phe Asn Trp Ala Leu Ala Asp Gly Leu		
460	465	470
acc gct gag aag tta aac atg gat gaa gca tat ggg ctc act cta caa		1491
Thr Ala Glu Lys Leu Asn Met Asp Glu Ala Tyr Gly Leu Thr Leu Gln		
475	480	485
490		
cga gct gca ccg tta atg gtg cac ccg cgc acc agg ctg gcc cca cag		1539
Arg Ala Ala Pro Leu Met Val His Pro Arg Thr Arg Leu Ala Pro Gln		
495	500	505
gca tat aaa act tca tca tct taa ttagagagct atgttctggg ttgtccccgtt		1593

Ala Tyr Lys Thr Ser Ser Ser
510

ttgatgtctc catgtttctt attaggttt aaatctgtaa gataaggtga ttctatgctg 1653
aatcacaaaa gttgctatct aaattccatg tccaatgaaa acgttcttct tcccttctta 1713
taatttatga atacttatga tataggcgac agcaa 1748

<210> 15
<211> 513
<212> PRT
<213> Rosa hybrida

<400> 15

Met Phe Leu Ile Val Val Ile Thr Phe Leu Phe Ala Val Phe Leu Phe
1 5 10 15
Arg Leu Leu Phe Ser Gly Lys Ser Gln Arg His Ser Leu Pro Leu Pro
20 25 30
Pro Gly Pro Lys Pro Trp Pro Val Val Gly Asn Leu Pro His Leu Gly
35 40 45
Pro Phe Pro His His Ser Ile Ala Glu Leu Ala Lys Lys His Gly Pro
50 55 60
Leu Met His Leu Arg Leu Gly Tyr Val Asp Val Val Val Ala Ala Ser
65 70 75 80
Ala Ser Val Ala Ala Gln Phe Leu Lys Thr His Asp Ala Asn Phe Ser
85 90 95
Ser Arg Pro Pro Asn Ser Gly Ala Lys His Leu Ala Tyr Asn Tyr Gln
100 105 110
Asp Leu Val Phe Arg Pro Tyr Gly Pro Arg Trp Arg Met Phe Arg Lys
115 120 125
Ile Ser Ser Val His Leu Phe Ser Gly Lys Ala Leu Asp Asp Leu Lys
130 135 140
His Val Arg Gln Glu Glu Val Ser Val Leu Ala His Ala Leu Ala Asn
145 150 155 160
Ser Gly Ser Lys Val Val Asn Leu Ala Gln Leu Leu Asn Leu Cys Thr
165 170 175
Val Asn Ala Leu Gly Arg Val Met Val Gly Arg Arg Val Phe Gly Asp
180 185 190
Gly Ser Gly Gly Asp Asp Pro Lys Ala Asp Glu Phe Lys Ser Met Val
195 200 205
Val Glu Met Met Val Leu Ala Gly Val Phe Asn Ile Gly Asp Phe Ile
210 215 220
Pro Ser Leu Glu Trp Leu Asp Leu Gln Gly Val Ala Ser Lys Met Lys
225 230 235 240
Lys Leu His Lys Arg Phe Asp Asp Phe Leu Thr Ala Ile Val Glu Asp
245 250 255
His Lys Lys Gly Ser Gly Thr Ala Gly His Val Asp Met Leu Thr Thr
260 265 270
Leu Leu Ser Leu Lys Glu Asp Ala Asp Gly Glu Gly Lys Leu Thr
275 280 285

Asp Thr Glu Ile Lys Ala Leu Leu Leu Asn Met Phe Thr Ala Gly Thr
 290 295 300
 Asp Thr Ser Ser Ser Thr Val Glu Trp Ala Ile Ala Glu Leu Ile Arg
 305 310 315 320
 His Pro His Met Leu Ala Arg Val Gln Lys Glu Leu Asp Asp Phe Val
 325 330 335
 Gly His Asp Arg Leu Val Thr Glu Ser Asp Ile Pro Asn Leu Pro Tyr
 340 345 350
 Leu Gln Ala Val Ile Lys Glu Thr Phe Arg Leu His Pro Ser Thr Pro
 355 360 365
 Leu Ser Leu Pro Arg Met Ala Ala Glu Ser Cys Glu Ile Asn Gly Tyr
 370 375 380
 His Ile Pro Lys Gly Ser Thr Leu Leu Val Asn Val Trp Ala Ile Ser
 385 390 395 400
 Arg Asp Pro Ala Glu Trp Ala Asp Pro Leu Glu Phe Lys Pro Glu Arg
 405 410 415
 Phe Leu Pro Gly Gly Glu Lys Pro Asn Val Asp Ile Arg Gly Asn Asp
 420 425 430
 Phe Glu Val Ile Pro Phe Gly Ala Gly Arg Arg Ile Cys Ala Gly Met
 435 440 445
 Ser Leu Gly Leu Arg Met Val His Leu Met Thr Ala Thr Leu Val His
 450 455 460
 Ala Phe Asn Trp Ala Leu Ala Asp Gly Leu Thr Ala Glu Lys Leu Asn
 465 470 475 480
 Met Asp Glu Ala Tyr Gly Leu Thr Leu Gln Arg Ala Ala Pro Leu Met
 485 490 495
 Val His Pro Arg Thr Arg Leu Ala Pro Gln Ala Tyr Lys Thr Ser Ser
 500 505 510
 Ser

<210> 16
 <211> 1660
 <212> DNA
 <213> Chrysanthemum

<220>
 <221> CDS
 <222> (4)..(1530)

<400> 16
 aaa atg acc att tta gct ttc gta ttt tac gcc ctc atc ctc ggg tca 48
 Met Thr Ile Leu Ala Phe Val Phe Tyr Ala Leu Ile Leu Gly Ser
 1 5 10 15

gta ctc tat gta ttt ctt aac tta agt tca cgt aaa tcc gcc aga ctc 96
 Val Leu Tyr Val Phe Leu Asn Leu Ser Ser Arg Lys Ser Ala Arg Leu
 20 25 30

cca ccc ggg cca aca cca tgg cct ata gtc ggg aac tta cca cac ctt 144
 Pro Pro Gly Pro Thr Pro Trp Pro Ile Val Gly Asn Leu Pro His Leu
 35 40 45

ggc cca atc cca cac cac gca ctc gcg gcc tta gcc aag aag tac ggg		192
Gly Pro Ile Pro His His Ala Leu Ala Ala Leu Ala Lys Lys Tyr Gly		
50	55	60
cca ttg atg cac ctg cgg ctc ggg tgt gtg gac gtg gtt gtg gcc gcg	240	
Pro Leu Met His Leu Arg Leu Gly Cys Val Asp Val Val Val Ala Ala		
65	70	75
tct gct tcc gta gct gca cag ttt tta aaa gtt cac gac gca aat ttt	288	
Ser Ala Ser Val Ala Ala Gln Phe Leu Lys Val His Asp Ala Asn Phe		
80	85	90
95		
gct agt agg ccg cca aat tct ggc gcg aaa cat gtg gcg tat aat tat	336	
Ala Ser Arg Pro Pro Asn Ser Gly Ala Lys His Val Ala Tyr Asn Tyr		
100	105	110
cag gat ctt gtg ttt gca cct tat ggt cca agg tgg cgt ttg tta agg	384	
Gln Asp Leu Val Phe Ala Pro Tyr Gly Pro Arg Trp Arg Leu Leu Arg		
115	120	125
aag att tgt tcg gtc cat ttg ttt tct gct aaa gca ctt gat gat ttt	432	
Lys Ile Cys Ser Val His Leu Phe Ser Ala Lys Ala Leu Asp Asp Phe		
130	135	140
cgt cat gtt cga cag gag gta gca gtc cta acc cgc gta cta ctg	480	
Arg His Val Arg Gln Glu Glu Val Ala Val Leu Thr Arg Val Leu Leu		
145	150	155
agt gct gga aac tca ccg gta cag ctt ggc caa cta ctt aac gtg tgt	528	
Ser Ala Gly Asn Ser Pro Val Gln Leu Gly Gln Leu Leu Asn Val Cys		
160	165	170
175		
gcc aca aac gcc tta gca cgg gta atg tta ggt agg aga gtt ttc gga	576	
Ala Thr Asn Ala Leu Ala Arg Val Met Leu Gly Arg Arg Val Phe Gly		
180	185	190
gac gga att gac agg tca gcc aat gag ttc aaa gat atg gta gta gag	624	
Asp Gly Ile Asp Arg Ser Ala Asn Glu Phe Lys Asp Met Val Val Glu		
195	200	205
tta atg gta tta gca gga gaa ttt aac ctt ggt gac ttt att cct gta	672	
Leu Met Val Leu Ala Gly Glu Phe Asn Leu Gly Asp Phe Ile Pro Val		
210	215	220
ctt gac cta ttc gac cta caa ggc att act aaa aaa atg aag aag ctt	720	
Leu Asp Leu Phe Asp Leu Gln Gly Ile Thr Lys Lys Met Lys Lys Leu		
225	230	235
cat gtt cgg ttc gat tca ttt ctt agt aag atc gtt gag gag cat aaa	768	
His Val Arg Phe Asp Ser Phe Leu Ser Lys Ile Val Glu Glu His Lys		
240	245	250
255		
acg gca cct ggt ggg ttg ggt cat act gat ttg ctg agc acg ttg att	816	

Thr Ala Pro Gly Gly Leu Gly His Thr Asp Leu Leu Ser Thr Leu Ile			
260	265	270	
tca ctt aaa gat gat gct gat att gaa ggt ggg aag ctt aca gat act			864
Ser Leu Lys Asp Asp Ala Asp Ile Glu Gly Gly Lys Leu Thr Asp Thr			
275	280	285	
gaa atc aaa gct ttg ctt ctg aat tta ttc gct gcg gga aca gac aca			912
Glu Ile Lys Ala Leu Leu Leu Asn Leu Phe Ala Ala Gly Thr Asp Thr			
290	295	300	
tcc tct agt aca gta gaa tgg gca ata gcc gaa ctc att cgt cat cca			960
Ser Ser Ser Thr Val Glu Trp Ala Ile Ala Glu Leu Ile Arg His Pro			
305	310	315	
caa ata tta aaa caa gcc cga gaa gag ata gac gct gta gtt ggt caa			1008
Gln Ile Leu Lys Gln Ala Arg Glu Glu Ile Asp Ala Val Val Gly Gln			
320	325	330	335
gac cgg ctt gta aca gaa ttg gac ttg agc caa cta aca tac ctc cag			1056
Asp Arg Leu Val Thr Glu Leu Asp Leu Ser Gln Leu Thr Tyr Leu Gln			
340	345	350	
gct ctt gtg aaa gag gtg ttt agg ctc cac cct tca acg cca ctc tcc			1104
Ala Leu Val Lys Glu Val Phe Arg Leu His Pro Ser Thr Pro Leu Ser			
355	360	365	
tta cca aga ata tca tcc gag agt tgt gag gtc gat ggg tat tat atc			1152
Leu Pro Arg Ile Ser Ser Glu Ser Cys Glu Val Asp Gly Tyr Tyr Ile			
370	375	380	
cct aag gga tcc aca ctc ctc gtt aac gtg tgg gcc att gcg cga gac			1200
Pro Lys Gly Ser Thr Leu Leu Val Asn Val Trp Ala Ile Ala Arg Asp			
385	390	395	
cca aaa atg tgg gcg gat cct ctt gaa ttt agg cct tct cgg ttt tta			1248
Pro Lys Met Trp Ala Asp Pro Leu Glu Phe Arg Pro Ser Arg Phe Leu			
400	405	410	415
ccc ggg gga gaa aag ccc ggt gct gat gtt agg gga aat gat ttt gaa			1296
Pro Gly Gly Glu Lys Pro Gly Ala Asp Val Arg Gly Asn Asp Phe Glu			
420	425	430	
gtt ata cca ttt ggg gca gga cga agg att tgt gcg ggt atg agc cta			1344
Val Ile Pro Phe Gly Ala Gly Arg Arg Ile Cys Ala Gly Met Ser Leu			
435	440	445	
ggc ttg aga atg gtc cag ttg ctc att gca aca ttg gtc caa act ttt			1392
Gly Leu Arg Met Val Gln Leu Leu Ile Ala Thr Leu Val Gln Thr Phe			
450	455	460	
gat tgg gaa ctg gct aac ggg tta gag ccg gag atg ctc aac atg gaa			1440
Asp Trp Glu Leu Ala Asn Gly Leu Glu Pro Glu Met Leu Asn Met Glu			
465	470	475	

gaa gcg tat gga ttg acc ctt caa cg_g gct gca ccc ttg atg gtt cac 1488
Glu Ala Tyr Gly Leu Thr Leu Gln Arg Ala Ala Pro Leu Met Val His
480 485 490 495

ccg aag ccg agg tta gct ccc cac gta tat gaa agt att taa 1530
Pro Lys Pro Arg Leu Ala Pro His Val Tyr Glu Ser Ile
500 505

ggactagttt ctctttgcc ttttgttc gcaaaggta atgaataaac gatttcatga 1590
ctcagatagt tatgtaaaca attgtgtttg ctgttatat atttatctat ttttctagaa 1650
caaaaaaaaaa 1660

<210> 17
<211> 508
<212> PRT
<213> Chrysanthemum

<400> 17
Met Thr Ile Leu Ala Phe Val Phe Tyr Ala Leu Ile Leu Gly Ser Val
1 5 10 15
Leu Tyr Val Phe Leu Asn Leu Ser Ser Arg Lys Ser Ala Arg Leu Pro
20 25 30
Pro Gly Pro Thr Pro Trp Pro Ile Val Gly Asn Leu Pro His Leu Gly
35 40 45
Pro Ile Pro His His Ala Leu Ala Leu Ala Lys Lys Tyr Gly Pro
50 55 60
Leu Met His Leu Arg Leu Gly Cys Val Asp Val Val Val Ala Ala Ser
65 70 75 80
Ala Ser Val Ala Ala Gln Phe Leu Lys Val His Asp Ala Asn Phe Ala
85 90 95
Ser Arg Pro Pro Asn Ser Gly Ala Lys His Val Ala Tyr Asn Tyr Gln
100 105 110
Asp Leu Val Phe Ala Pro Tyr Gly Pro Arg Trp Arg Leu Leu Arg Lys
115 120 125
Ile Cys Ser Val His Leu Phe Ser Ala Lys Ala Leu Asp Asp Phe Arg
130 135 140
His Val Arg Gln Glu Glu Val Ala Val Leu Thr Arg Val Leu Leu Ser
145 150 155 160
Ala Gly Asn Ser Pro Val Gln Leu Gly Gln Leu Leu Asn Val Cys Ala
165 170 175
Thr Asn Ala Leu Ala Arg Val Met Leu Gly Arg Arg Val Phe Gly Asp
180 185 190
Gly Ile Asp Arg Ser Ala Asn Glu Phe Lys Asp Met Val Val Glu Leu
195 200 205
Met Val Leu Ala Gly Glu Phe Asn Leu Gly Asp Phe Ile Pro Val Leu
210 215 220
Asp Leu Phe Asp Leu Gln Gly Ile Thr Lys Lys Met Lys Lys Leu His
225 230 235 240
Val Arg Phe Asp Ser Phe Leu Ser Lys Ile Val Glu Glu His Lys Thr
245 250 255

Ala Pro Gly Gly Leu Gly His Thr Asp Leu Leu Ser Thr Leu Ile Ser
 260 265 270
 Leu Lys Asp Asp Ala Asp Ile Glu Gly Gly Lys Leu Thr Asp Thr Glu
 275 280 285
 Ile Lys Ala Leu Leu Leu Asn Leu Phe Ala Ala Gly Thr Asp Thr Ser
 290 295 300
 Ser Ser Thr Val Glu Trp Ala Ile Ala Glu Leu Ile Arg His Pro Gln
 305 310 315 320
 Ile Leu Lys Gln Ala Arg Glu Glu Ile Asp Ala Val Val Gly Gln Asp
 325 330 335
 Arg Leu Val Thr Glu Leu Asp Leu Ser Gln Leu Thr Tyr Leu Gln Ala
 340 345 350
 Leu Val Lys Glu Val Phe Arg Leu His Pro Ser Thr Pro Leu Ser Leu
 355 360 365
 Pro Arg Ile Ser Ser Glu Ser Cys Glu Val Asp Gly Tyr Tyr Ile Pro
 370 375 380
 Lys Gly Ser Thr Leu Leu Val Asn Val Trp Ala Ile Ala Arg Asp Pro
 385 390 395 400
 Lys Met Trp Ala Asp Pro Leu Glu Phe Arg Pro Ser Arg Phe Leu Pro
 405 410 415
 Gly Gly Glu Lys Pro Gly Ala Asp Val Arg Gly Asn Asp Phe Glu Val
 420 425 430
 Ile Pro Phe Gly Ala Gly Arg Arg Ile Cys Ala Gly Met Ser Leu Gly
 435 440 445
 Leu Arg Met Val Gln Leu Leu Ile Ala Thr Leu Val Gln Thr Phe Asp
 450 455 460
 Trp Glu Leu Ala Asn Gly Leu Glu Pro Glu Met Leu Asn Met Glu Glu
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Met Ser Pro
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tta gcc ttg atg atc ata agt acc tta tta ggg ttt ctc cta tac cac 163
Leu Ala Leu Met Ile Ile Ser Thr Leu Leu Gly Phe Leu Leu Tyr His
5 10 15

tct ctt cgc tta cta ctc ttc tcc ggc caa ggt cgc cga cta cta cca Ser Leu Arg Leu Leu Leu Phe Ser Gly Gln Gly Arg Arg Leu Leu Pro	20	25	30	35	211
cca ggt cca cgc ccg tgg ccg ctg gtg gga aat ctc ccg cac tta ggc Pro Gly Pro Arg Pro Trp Pro Leu Val Gly Asn Leu Pro His Leu Gly	40	45	50		259
ccg aag cca cac gcc tcc atg gcc gag ctc gcg cga gcc tac gga ccc Pro Lys Pro His Ala Ser Met Ala Glu Leu Ala Arg Ala Tyr Gly Pro	55	60	65		307
ctc atg cac cta aag atg ggg ttc gtc cac gtc gtg gtg gct tcg tcg Leu Met His Leu Lys Met Gly Phe Val His Val Val Val Ala Ser Ser	70	75	80		355
gcg agc gcg gcg gag cag tgc ctg agg gtt cac gac gcg aat ttc ttg Ala Ser Ala Ala Glu Gln Cys Leu Arg Val His Asp Ala Asn Phe Leu	85	90	95		403
agc agg cca ccc aac tcc ggc gcc aag cac gtc gct tac aac tac gag Ser Arg Pro Pro Asn Ser Gly Ala Lys His Val Ala Tyr Asn Tyr Glu	100	105	110	115	451
gac ttg gtt ttc aga ccg tac ggt ccc aag tgg agg ctg ttg agg aag Asp Leu Val Phe Arg Pro Tyr Gly Pro Lys Trp Arg Leu Leu Arg Lys	120	125	130		499
ata tgc gct cag cat att ttc tcc gtc aag gct atg gat gac ttc agg Ile Cys Ala Gln His Ile Phe Ser Val Lys Ala Met Asp Asp Phe Arg	135	140	145		547
cgc gtc aga gag gaa gag gtg gcc atc ctg agt cgc gct cta gca ggc Arg Val Arg Glu Glu Val Ala Ile Leu Ser Arg Ala Leu Ala Gly	150	155	160		595
aaa agg gcc gta ccc ata ggc caa atg ctc aac gtg tgc gcc aca aac Lys Arg Ala Val Pro Ile Gly Gln Met Leu Asn Val Cys Ala Thr Asn	165	170	175		643
gcc cta tct cgc gtc atg atg ggg cg ^g cgc gtg gtg ggc cac gcg gat Ala Leu Ser Arg Val Met Met Gly Arg Arg Val Val Gly His Ala Asp	180	185	190	195	691
gga acc aac gac gcc aag gcg gag gag ttc aaa gcc atg gtc gtc gag Gly Thr Asn Asp Ala Lys Ala Glu Glu Phe Lys Ala Met Val Val Glu	200	205	210		739
ctc atg gtc ctc tcc ggc gtc ttc aac atc ggt gat ttc atc ccc ttc Leu Met Val Leu Ser Gly Val Phe Asn Ile Gly Asp Phe Ile Pro Phe	215	220	225		787
ctc gag cct ctc gac ttg cag gga gtg gct tcc aag atg aag aaa ctc					835

Leu	Glu	Pro	Leu	Asp	Leu	Gln	Gly	Val	Ala	Ser	Lys	Met	Lys	Lys	Leu
230								235					240		
cac gcg cggttc gat gca ttcttg acc gag att gta cga gag cgt tgt															883
His	Ala	Arg	Phe	Asp	Ala	Phe	Leu	Thr	Glu	Ile	Val	Arg	Glu	Arg	Cys
245										255					
cat ggg cag atc aac aac agt ggt gct cat cag gat gat ttg ctt agc															931
His	Gly	Gln	Ile	Asn	Asn	Ser	Gly	Ala	His	Gln	Asp	Asp	Leu	Leu	Ser
260				265						270				275	
acg ttg att tcg ttc aaa ggg ctt gac gat ggc gat ggt tcc agg ctc															979
Thr	Leu	Ile	Ser	Phe	Lys	Gly	Leu	Asp	Asp	Gly	Asp	Gly	Ser	Arg	Leu
280								285					290		
act gac aca gaa atc aag gcg ctg ctc ttg aac ctt ttg gac acg acg															1027
Thr	Asp	Thr	Glu	Ile	Lys	Ala	Leu	Leu	Asn	Leu	Leu	Asp	Thr	Thr	
295								300					305		
tcg agc acg gtg gaa tgg gcc gta gcc gaa ctc cta cgc cac cct aag															1075
Ser	Ser	Thr	Val	Glu	Trp	Ala	Val	Ala	Glu	Leu	Leu	Arg	His	Pro	Lys
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aca tta gcc caa gtc cggtaa gag ctc gac tcg gtc gtgggt aag aac															1123
Thr	Leu	Ala	Gln	Val	Arg	Gln	Glu	Leu	Asp	Ser	Val	Val	Gly	Lys	Asn
325							330					335			
agg ctc gtg tcc gag acc gat ctg aat cag ctg ccc tat cta caa gct															1171
Arg	Leu	Val	Ser	Glu	Thr	Asp	Leu	Asn	Gln	Leu	Pro	Tyr	Leu	Gln	Ala
340							345				350			355	
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Val	Val	Lys	Glu	Thr	Phe	Arg	Leu	His	Pro	Pro	Thr	Pro	Leu	Ser	Leu
360								365					370		
ccg aga ctc gcg gaa gat gat tgc gag atc gac gga tac ctc atc ccc															1267
Pro	Arg	Leu	Ala	Glu	Asp	Asp	Cys	Glu	Ile	Asp	Gly	Tyr	Leu	Ile	Pro
375								380					385		
aag ggc tcg acc ctt ctg gtg aac gtt tgg gcc ata gcc cgc gat ccc															1315
Lys	Gly	Ser	Thr	Leu	Leu	Val	Asn	Val	Trp	Ala	Ile	Ala	Arg	Asp	Pro
390							395					400			
aag gtt tgg gcc gat ccg ttg gag ttt agg ccc gaa cga ttc ttg acg															1363
Lys	Val	Trp	Ala	Asp	Pro	Leu	Glu	Phe	Arg	Pro	Glu	Arg	Phe	Leu	Thr
405								410					415		
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Gly	Gly	Glu	Lys	Ala	Asp	Val	Asp	Val	Lys	Gly	Asn	Asp	Phe	Glu	Val
420								425					430		435
ata ccg ttc ggg gcg ggt cgt agg atc tgc gct ggc gtt ggc ttg gga															1459
Ile	Pro	Phe	Gly	Ala	Gly	Arg	Arg	Ile	Cys	Ala	Gly	Val	Gly	Leu	Gly
440								445					450		

ata cgt atg gtc caa ctg ttg acg gcg agt ttg atc cat gca ttc gat		1507	
Ile Arg Met Val Gln Leu Leu Thr Ala Ser Leu Ile His Ala Phe Asp			
455	460	465	
ctg gac ctt gct aat ggg ctt ttg gcc caa aat ctg aac atg gaa gaa		1555	
Leu Asp Leu Ala Asn Gly Leu Leu Ala Gln Asn Leu Asn Met Glu Glu			
470	475	480	
gca tat ggg ctt acg cta caa cgg gct gag cct ttg ttg gtc cac cct		1603	
Ala Tyr Gly Leu Thr Leu Gln Arg Ala Glu Pro Leu Leu Val His Pro			
485	490	495	
agg ccg cgg ttg gcc act cat gtc tat taa tttaatttagg cctaaactac		1653	
Arg Pro Arg Leu Ala Thr His Val Tyr			
500	505		
gatgaatgac ccatttaacg ttaataagag tttcaattt atgtgagttt gcatggatg		1713	
gtatggatg gtgcttgtaa taaattgtat ctgttaggtg tgttcattga tgataaatct		1773	
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20	25	30	
Leu Leu Pro Pro Gly Pro Arg Pro Trp Pro Leu Val Gly Asn Leu Pro			
35	40	45	
His Leu Gly Pro Lys Pro His Ala Ser Met Ala Glu Leu Ala Arg Ala			
50	55	60	
Tyr Gly Pro Leu Met His Leu Lys Met Gly Phe Val His Val Val Val			
65	70	75	80
Ala Ser Ser Ala Ser Ala Ala Glu Gln Cys Leu Arg Val His Asp Ala			
85	90	95	
Asn Phe Leu Ser Arg Pro Pro Asn Ser Gly Ala Lys His Val Ala Tyr			
100	105	110	
Asn Tyr Glu Asp Leu Val Phe Arg Pro Tyr Gly Pro Lys Trp Arg Leu			
115	120	125	
Leu Arg Lys Ile Cys Ala Gln His Ile Phe Ser Val Lys Ala Met Asp			
130	135	140	
Asp Phe Arg Arg Val Arg Glu Glu Glu Val Ala Ile Leu Ser Arg Ala			
145	150	155	160
Leu Ala Gly Lys Arg Ala Val Pro Ile Gly Gln Met Leu Asn Val Cys			
165	170	175	
Ala Thr Asn Ala Leu Ser Arg Val Met Met Gly Arg Arg Val Val Gly			
180	185	190	

His	Ala	Asp	Gly	Thr	Asn	Asp	Ala	Lys	Ala	Glu	Glu	Phe	Lys	Ala	Met
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Val	Val	Glu	Leu	Met	Val	Leu	Ser	Gly	Val	Phe	Asn	Ile	Gly	Asp	Phe
210							215						220		
Ile	Pro	Phe	Leu	Glu	Pro	Leu	Asp	Leu	Gln	Gly	Val	Ala	Ser	Lys	Met
225							230				235			240	
Lys	Lys	Leu	His	Ala	Arg	Phe	Asp	Ala	Phe	Leu	Thr	Glu	Ile	Val	Arg
							245			250			255		
Glu	Arg	Cys	His	Gly	Gln	Ile	Asn	Asn	Ser	Gly	Ala	His	Gln	Asp	Asp
							260			265			270		
Leu	Leu	Ser	Thr	Leu	Ile	Ser	Phe	Lys	Gly	Leu	Asp	Asp	Gly	Asp	Gly
							275			280			285		
Ser	Arg	Leu	Thr	Asp	Thr	Glu	Ile	Lys	Ala	Leu	Leu	Asn	Leu	Leu	
							290			295			300		
Asp	Thr	Thr	Ser	Ser	Thr	Val	Glu	Trp	Ala	Val	Ala	Glu	Leu	Leu	Arg
305							310				315			320	
His	Pro	Lys	Thr	Leu	Ala	Gln	Val	Arg	Gln	Glu	Leu	Asp	Ser	Val	Val
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Gly	Lys	Asn	Arg	Leu	Val	Ser	Glu	Thr	Asp	Leu	Asn	Gln	Leu	Pro	Tyr
							340			345			350		
Leu	Gln	Ala	Val	Val	Lys	Glu	Thr	Phe	Arg	Leu	His	Pro	Pro	Thr	Pro
							355			360			365		
Leu	Ser	Leu	Pro	Arg	Leu	Ala	Glu	Asp	Asp	Cys	Glu	Ile	Asp	Gly	Tyr
							370			375			380		
Leu	Ile	Pro	Lys	Gly	Ser	Thr	Leu	Leu	Val	Asn	Val	Trp	Ala	Ile	Ala
385							390				395			400	
Arg	Asp	Pro	Lys	Val	Trp	Ala	Asp	Pro	Leu	Glu	Phe	Arg	Pro	Glu	Arg
							405			410			415		
Phe	Leu	Thr	Gly	Gly	Glu	Lys	Ala	Asp	Val	Asp	Val	Lys	Gly	Asn	Asp
							420			425			430		
Phe	Glu	Val	Ile	Pro	Phe	Gly	Ala	Gly	Arg	Arg	Ile	Cys	Ala	Gly	Val
							435			440			445		
Gly	Leu	Gly	Ile	Arg	Met	Val	Gln	Leu	Leu	Thr	Ala	Ser	Leu	Ile	His
							450			455			460		
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465							470				475			480	
Met	Glu	Glu	Ala	Tyr	Gly	Leu	Thr	Leu	Gln	Arg	Ala	Glu	Pro	Leu	Leu
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Val	His	Pro	Arg	Pro	Arg	Leu	Ala	Thr	His	Val	Tyr				
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1				5				10				15				
ttt ctt att ctc agg gtg aaa cag cgt tac cct tta cct ctc cca ccc 97																
Phe Leu Ile Leu Arg Val Lys Gln Arg Tyr Pro Leu Pro Leu Pro Pro																
20 25 30																
gga cca aaa cca tgg ccg gtg tta gga aac ctt ccc cac ctg ggc aag 145																
Gly Pro Lys Pro Trp Pro Val Leu Gly Asn Leu Pro His Leu Gly Lys																
35 40 45																
aag cct cac cag tcg att gcg gcc atg gct gag agg tac ggc ccc ctc 193																
Lys Pro His Gln Ser Ile Ala Ala Met Ala Glu Arg Tyr Gly Pro Leu																
50 55 60																
atg cac ctc cgc cta gga ttc gtg gac gtg gtt gtg gcc gcc tcc gcc 241																
Met His Leu Arg Leu Gly Phe Val Asp Val Val Val Ala Ala Ser Ala																
65 70 75 80																
gcc gtg gcc gct cag ttc ttg aaa gtt cac gac tcg aac ttc tcc aac 289																
Ala Val Ala Ala Gln Phe Leu Lys Val His Asp Ser Asn Phe Ser Asn																
85 90 95																
cgcg ccg ccg aac tcc ggc gcg gaa cac att gct tat aac tat caa gac 337																
Arg Pro Pro Asn Ser Gly Ala Glu His Ile Ala Tyr Asn Tyr Gln Asp																
100 105 110																
ctc gtc ttc gcg ccc tac ggc ccg cgg tgg cgc atg ctt agg aag atc 385																
Leu Val Phe Ala Pro Tyr Gly Pro Arg Trp Arg Met Leu Arg Lys Ile																
115 120 125																
acc tcc gtg cat ctc ttc tcg gcc aag gcg ttg gat gac ttc tgc cat 433																
Thr Ser Val His Leu Phe Ser Ala Lys Ala Leu Asp Asp Phe Cys His																
130 135 140																
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Val Arg Gln Glu Glu Val Ala Thr Leu Thr Arg Ser Leu Ala Ser Ala																
145 150 155 160																
ggc aaa act cca gta aaa cta ggg cag tta cta aac gtg tgc acc acg 529																
Gly Lys Thr Pro Val Lys Leu Gly Gln Leu Leu Asn Val Cys Thr Thr																
165 170 175																
aac gcc cta gct cgt gta atg cta ggg cgg aag gtc ttt aat gac gga 577																
Asn Ala Leu Ala Arg Val Met Leu Gly Arg Lys Val Phe Asn Asp Gly																
180 185 190																
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Gly Ser Lys Ser Asp Pro Lys Ala Glu Glu Phe Lys Ser Met Val Glu																
195 200 205																
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Glu Met Met Val Leu Ala Gly Ser Phe Asn Ile Gly Asp Phe Ile Pro																
210 215 220																

gtc ttg ggt tgg ttt gac gtt cag ggt atc gta ggg aag atg aag aaa		721
Val Leu Gly Trp Phe Asp Val Gln Gly Ile Val Gly Lys Met Lys Lys		
225	230	235
240		
cta cac gcg cgt ttt gat gcg ttc ttg aac acc att cta gag gaa cac		769
Leu His Ala Arg Phe Asp Ala Phe Leu Asn Thr Ile Leu Glu Glu His		
245	250	255
aaa tgt gtc aac aat caa cac acg acg ttg tcg aaa gat gtg gac ttc		817
Lys Cys Val Asn Asn Gln His Thr Thr Leu Ser Lys Asp Val Asp Phe		
260	265	270
ttg agc acc cta att agg ctc aaa gat aat ggg gct gat atg gat tgt		865
Leu Ser Thr Leu Ile Arg Leu Lys Asp Asn Gly Ala Asp Met Asp Cys		
275	280	285
gaa gag gga aaa ctc acc gac act gaa att aag gct ttg ctc ttg aac		913
Glu Glu Gly Lys Leu Thr Asp Thr Glu Ile Lys Ala Leu Leu Leu Asn		
290	295	300
ctg ttc aca gct ggg act gat aca tca tct agc act gtg gag tgg gca		961
Leu Phe Thr Ala Gly Thr Asp Thr Ser Ser Thr Val Glu Trp Ala		
305	310	315
320		
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Ile Ala Glu Leu Leu Arg Asn Pro Lys Ile Leu Asn Gln Ala Gln Gln		
325	330	335
gag ctt gac tta gtg gtg ggt caa aat cag cta gtc aca gaa tct gac		1057
Glu Leu Asp Leu Val Val Gly Gln Asn Gln Leu Val Thr Glu Ser Asp		
340	345	350
tta acc gat cta cct ttc ctg caa gca ata gtg aag gag acc ttc agg		1105
Leu Thr Asp Leu Pro Phe Leu Gln Ala Ile Val Lys Glu Thr Phe Arg		
355	360	365
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Leu His Pro Ser Thr Pro Leu Ser Leu Pro Arg Met Gly Ala Gln Gly		
370	375	380
tgc gag atc aat ggc tac ttc atc ccc aaa ggc gca acg ctt ttg gtc		1201
Cys Glu Ile Asn Gly Tyr Phe Ile Pro Lys Gly Ala Thr Leu Leu Val		
385	390	395
400		
aac gtt tgg gcc ata gct cgt gat ccc aat gtg tgg aca aat cct ctt		1249
Asn Val Trp Ala Ile Ala Arg Asp Pro Asn Val Trp Thr Asn Pro Leu		
405	410	415
gag ttc aac cca cac cga ttc ttg cct ggt gga gaa aag ccc aac gtg		1297
Glu Phe Asn Pro His Arg Phe Leu Pro Gly Gly Glu Lys Pro Asn Val		
420	425	430
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Asp Ile Lys Gly Asn Asp Phe Glu Val Ile Pro Phe Gly Ala Gly Arg			
435	440	445	
aga ata tgc tct ggg atg agt ttg ggg ata agg atg gtt cac ctg ttg			1393
Arg Ile Cys Ser Gly Met Ser Leu Gly Ile Arg Met Val His Leu Leu			
450	455	460	
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Val Ala Thr Leu Val His Ala Phe Asp Trp Asp Leu Val Asn Gly Gln			
465	470	475	480
tct gta gag acg ctc aat atg gag gaa gct tat ggt ctc acc ctt caa			1489
Ser Val Glu Thr Leu Asn Met Glu Glu Ala Tyr Gly Leu Thr Leu Gln			
485	490	495	
cga gct gtt cct ttg atg ttg cat cca aag ccc aga tta caa cca cat			1537
Arg Ala Val Pro Leu Met Leu His Pro Lys Pro Arg Leu Gln Pro His			
500	505	510	
ctc tat act ctc aat taa attgcaattt gattttggtg attataacaat			1585
Leu Tyr Thr Leu Asn			
515			
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aaggtagtacg tttcgacctt aaaagttgtta aaagagggtcc tacatatgtta aaagcccgcc			1705
aaaggaaaaac tggttgtatt caattccgct aggccgttc cgaaagacct catgaagact			1765
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35	40	45	
Lys Pro His Gln Ser Ile Ala Ala Met Ala Glu Arg Tyr Gly Pro Leu			
50	55	60	
Met His Leu Arg Leu Gly Phe Val Asp Val Val Val Ala Ala Ser Ala			
65	70	75	80
Ala Val Ala Ala Gln Phe Leu Lys Val His Asp Ser Asn Phe Ser Asn			
85	90	95	
Arg Pro Pro Asn Ser Gly Ala Glu His Ile Ala Tyr Asn Tyr Gln Asp			
100	105	110	
Leu Val Phe Ala Pro Tyr Gly Pro Arg Trp Arg Met Leu Arg Lys Ile			
115	120	125	

Thr Ser Val His Leu Phe Ser Ala Lys Ala Leu Asp Asp Phe Cys His
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 180 185 190
 Gly Ser Lys Ser Asp Pro Lys Ala Glu Glu Phe Lys Ser Met Val Glu
 195 200 205
 Glu Met Met Val Leu Ala Gly Ser Phe Asn Ile Gly Asp Phe Ile Pro
 210 215 220
 Val Leu Gly Trp Phe Asp Val Gln Gly Ile Val Gly Lys Met Lys Lys
 225 230 235 240
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 Lys Cys Val Asn Asn Gln His Thr Thr Leu Ser Lys Asp Val Asp Phe
 260 265 270
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 275 280 285
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 Leu Phe Thr Ala Gly Thr Asp Thr Ser Ser Thr Val Glu Trp Ala
 305 310 315 320
 Ile Ala Glu Leu Leu Arg Asn Pro Lys Ile Leu Asn Gln Ala Gln Gln
 325 330 335
 Glu Leu Asp Leu Val Val Gly Gln Asn Gln Leu Val Thr Glu Ser Asp
 340 345 350
 Leu Thr Asp Leu Pro Phe Leu Gln Ala Ile Val Lys Glu Thr Phe Arg
 355 360 365
 Leu His Pro Ser Thr Pro Leu Ser Leu Pro Arg Met Gly Ala Gln Gly
 370 375 380
 Cys Glu Ile Asn Gly Tyr Phe Ile Pro Lys Gly Ala Thr Leu Leu Val
 385 390 395 400
 Asn Val Trp Ala Ile Ala Arg Asp Pro Asn Val Trp Thr Asn Pro Leu
 405 410 415
 Glu Phe Asn Pro His Arg Phe Leu Pro Gly Gly Glu Lys Pro Asn Val
 420 425 430
 Asp Ile Lys Gly Asn Asp Phe Glu Val Ile Pro Phe Gly Ala Gly Arg
 435 440 445
 Arg Ile Cys Ser Gly Met Ser Leu Gly Ile Arg Met Val His Leu Leu
 450 455 460
 Val Ala Thr Leu Val His Ala Phe Asp Trp Asp Leu Val Asn Gly Gln
 465 470 475 480
 Ser Val Glu Thr Leu Asn Met Glu Glu Ala Tyr Gly Leu Thr Leu Gln
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ctc gcg gaa atg gcg aaa acc tac ggt ccg ctc atg cac ttg aag ttc 96
 Leu Ala Glu Met Ala Lys Thr Tyr Gly Pro Leu Met His Leu Lys Phe
20 25 30

ggg ctt aag gac gcg gtg gtg gcg tcg tct gcg tcg gtg gca gag cag 144
 Gly Leu Lys Asp Ala Val Val Ala Ser Ser Ala Ser Val Ala Glu Gln
 35 40 45

ttt ctg aag aaa cac gac gtg aat ttc tcg aac cgg ccg cca aac tcc 192
 Phe Leu Lys Lys His Asp Val Asn Phe Ser Asn Arg Pro Pro Asn Ser
 50 55 60

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ggg gcc aaa cat ata gct tat aac tat cag gac ctg gta ttc gct ccc 240
Gly Ala Lys His Ile Ala Tyr Asn Tyr Gln Asp Leu Val Phe Ala Pro
   65          70          75          80

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tat gga ccc cgg tgg cg^g ttg ctt agg aaa atc tgt tcc gtc cat ctt 288
 Tyr Gly Pro Arg Trp Arg Leu Leu Arg Lys Ile Cys Ser Val His Leu
 85 90 95

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ttc tcg tct aag gcc ttg gat gac ttt cag cat gtt cga cat gag gag 336
Phe Ser Ser Lys Ala Leu Asp Asp Phe Gln His Val Arg His Glu Glu
          100           105           110

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ata tgc atc ctt ata cga gca ata gcg agt ggc ggt cat gct ccg gtg 384
Ile Cys Ile Leu Ile Arg Ala Ile Ala Ser Gly Gly His Ala Pro Val
115 120 125

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aat tta ggc aag tta gga gtg tgc aca acc aat gcc ctg gca aga 432
Asn Leu Gly Lys Leu Leu Gly Val Cys Thr Thr Asn Ala Leu Ala Arg
130           135           140

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gtg atg ctt gga aga aga gta ttc gaa ggc gac ggc ggc gag aat ccg 480
Val Met Leu Gly Arg Arg Val Phe Glu Gly Asp Gly Gly Glu Asn Pro
145           150           155           160

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cat gcc gac gag ttt aaa tca atg gtg gtg gag att atg gtg tta gcc 528
 His Ala Asp Glu Phe Lys Ser Met Val Val Glu Ile Met Val Leu Ala
 165 170 175

ggg gca ttc aac ttg ggt gat ttc atc ccg gtt cta gat tgg ttc gat 576

Gly Ala Phe Asn Leu Gly Asp Phe Ile Pro Val Leu Asp Trp Phe Asp			
180	185	190	
ttg caa gga att gct ggt aaa atg aag aaa ctt cat gcc cgt ttc gac			624
Leu Gln Gly Ile Ala Gly Lys Met Lys Lys Leu His Ala Arg Phe Asp			
195	200	205	
aag ttt tta aat ggg atc cta gaa gat cgt aaa tct aac ggc tct aat			672
Lys Phe Leu Asn Gly Ile Leu Glu Asp Arg Lys Ser Asn Gly Ser Asn			
210	215	220	
gga gct gaa caa tac gtg gac ttg ctc agt gtg ttg atc tct ctt caa			720
Gly Ala Glu Gln Tyr Val Asp Leu Leu Ser Val Leu Ile Ser Leu Gln			
225	230	235	240
gat agt aat atc gac ggt ggt gac gaa gga acc aaa ctc aca gat act			768
Asp Ser Asn Ile Asp Gly Gly Asp Glu Gly Thr Lys Leu Thr Asp Thr			
245	250	255	
gaa atc aaa gct ctc ctt ttg aac ttg ttc ata gcc gga aca gac act			816
Glu Ile Lys Ala Leu Leu Asn Leu Phe Ile Ala Gly Thr Asp Thr			
260	265	270	
tca tca agt act gta gaa tgg gcc atg gca gaa cta atc cga aac cca			864
Ser Ser Ser Thr Val Glu Trp Ala Met Ala Glu Leu Ile Arg Asn Pro			
275	280	285	
aag tta cta gtc caa gcc caa gaa gag cta gac aga gta gtc ggg ccg			912
Lys Leu Leu Val Gln Ala Gln Glu Glu Leu Asp Arg Val Val Gly Pro			
290	295	300	
aac cga ttc gta acc gaa tct gat ctt cct caa ctg aca ttc ctt caa			960
Asn Arg Phe Val Thr Glu Ser Asp Leu Pro Gln Leu Thr Phe Leu Gln			
305	310	315	320
gcc gtc atc aaa gag act ttc agg ctt cat cca tcc acc cca ctc tct			1008
Ala Val Ile Lys Glu Thr Phe Arg Leu His Pro Ser Thr Pro Leu Ser			
325	330	335	
ctt cca cga atg gcg gcg gag gac tgt gag atc aat ggg tat tat gtc			1056
Leu Pro Arg Met Ala Ala Glu Asp Cys Glu Ile Asn Gly Tyr Tyr Val			
340	345	350	
tca gaa ggt tcg aca ttg ctc gtc aat gtg tgg gcc ata gct cgt gat			1104
Ser Glu Gly Ser Thr Leu Leu Val Asn Val Trp Ala Ile Ala Arg Asp			
355	360	365	
cca aat gcg tgg gcc aat cca cta gat ttc aac ccg act cgt ttc ttg			1152
Pro Asn Ala Trp Ala Asn Pro Leu Asp Phe Asn Pro Thr Arg Phe Leu			
370	375	380	
gcc ggt gga gag aag cct aat gtt gat gtt aaa ggg aat gat ttt gaa			1200
Ala Gly Gly Glu Lys Pro Asn Val Asp Val Lys Gly Asn Asp Phe Glu			
385	390	395	400

gtg ata cct ttc ggt gct ggg cgc agg ata tgt gcc gga atg agc tta		1248
Val Ile Pro Phe Gly Ala Gly Arg Arg Ile Cys Ala Gly Met Ser Leu		
405	410	415
ggt ata cgg atg gtt caa cta gta acg gct tcg tta gtt cat tcg ttt		1296
Gly Ile Arg Met Val Gln Leu Val Thr Ala Ser Leu Val His Ser Phe		
420	425	430
gat tgg gct ttg ttg gat gga ctt aaa ccc gag aag ctt gac atg gag		1344
Asp Trp Ala Leu Leu Asp Gly Leu Lys Pro Glu Lys Leu Asp Met Glu		
435	440	445
gaa ggt tat gga cta acg ctt caa cga gct tca cct tta atc gtc cat		1392
Glu Gly Tyr Gly Leu Thr Leu Gln Arg Ala Ser Pro Leu Ile Val His		
450	455	460
cca aag ccg agg ctc tcg gct caa gtt tat tgt atg taa caagtttg		1441
Pro Lys Pro Arg Leu Ser Ala Gln Val Tyr Cys Met		
465	470	475
aagccagtct gatttcagtt ggattttagt ttatttatgt atcatttggt attttatttt		1501
gtatttcggt tgaataacaat aaagggaagg tggatcgct gctgtataat agcgacgtt		1561
taacgtgttg tgatagtacc gtgtttact aaaacgatgt cgtttgattt tttatagtat		1621
taaaaaaaaata aacagctgga ttttgaacca aaaaaaaaaaaa aaaaaaa		1667

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<213> Gentian

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Gly Leu Lys Asp Ala Val Ala Ser Ser Ala Ser Val Ala Glu Gln
35 40 45
Phe Leu Lys Lys His Asp Val Asn Phe Ser Asn Arg Pro Pro Asn Ser
50 55 60
Gly Ala Lys His Ile Ala Tyr Asn Tyr Gln Asp Leu Val Phe Ala Pro
65 70 75 80
Tyr Gly Pro Arg Trp Arg Leu Leu Arg Lys Ile Cys Ser Val His Leu
85 90 95
Phe Ser Ser Lys Ala Leu Asp Asp Phe Gln His Val Arg His Glu Glu
100 105 110
Ile Cys Ile Leu Ile Arg Ala Ile Ala Ser Gly Gly His Ala Pro Val
115 120 125
Asn Leu Gly Lys Leu Leu Gly Val Cys Thr Thr Asn Ala Leu Ala Arg
130 135 140

Val Met Leu Gly Arg Arg Val Phe Glu Gly Asp Gly Gly Glu Asn Pro
 145 150 155 160
 His Ala Asp Glu Phe Lys Ser Met Val Val Glu Ile Met Val Leu Ala
 165 170 175
 Gly Ala Phe Asn Leu Gly Asp Phe Ile Pro Val Leu Asp Trp Phe Asp
 180 185 190
 Leu Gln Gly Ile Ala Gly Lys Met Lys Lys Leu His Ala Arg Phe Asp
 195 200 205
 Lys Phe Leu Asn Gly Ile Leu Glu Asp Arg Lys Ser Asn Gly Ser Asn
 210 215 220
 Gly Ala Glu Gln Tyr Val Asp Leu Leu Ser Val Leu Ile Ser Leu Gln
 225 230 235 240
 Asp Ser Asn Ile Asp Gly Gly Asp Glu Gly Thr Lys Leu Thr Asp Thr
 245 250 255
 Glu Ile Lys Ala Leu Leu Leu Asn Leu Phe Ile Ala Gly Thr Asp Thr
 260 265 270
 Ser Ser Ser Thr Val Glu Trp Ala Met Ala Glu Leu Ile Arg Asn Pro
 275 280 285
 Lys Leu Leu Val Gln Ala Gln Glu Glu Leu Asp Arg Val Val Gly Pro
 290 295 300
 Asn Arg Phe Val Thr Glu Ser Asp Leu Pro Gln Leu Thr Phe Leu Gln
 305 310 315 320
 Ala Val Ile Lys Glu Thr Phe Arg Leu His Pro Ser Thr Pro Leu Ser
 325 330 335
 Leu Pro Arg Met Ala Ala Glu Asp Cys Glu Ile Asn Gly Tyr Tyr Val
 340 345 350
 Ser Glu Gly Ser Thr Leu Leu Val Asn Val Trp Ala Ile Ala Arg Asp
 355 360 365
 Pro Asn Ala Trp Ala Asn Pro Leu Asp Phe Asn Pro Thr Arg Phe Leu
 370 375 380
 Ala Gly Gly Glu Lys Pro Asn Val Asp Val Lys Gly Asn Asp Phe Glu
 385 390 395 400
 Val Ile Pro Phe Gly Ala Gly Arg Arg Ile Cys Ala Gly Met Ser Leu
 405 410 415
 Gly Ile Arg Met Val Gln Leu Val Thr Ala Ser Leu Val His Ser Phe
 420 425 430
 Asp Trp Ala Leu Leu Asp Gly Leu Lys Pro Glu Lys Leu Asp Met Glu
 435 440 445
 Glu Gly Tyr Gly Leu Thr Leu Gln Arg Ala Ser Pro Leu Ile Val His
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 Pro Lys Pro Arg Leu Ser Ala Gln Val Tyr Cys Met
 465 470 475

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1 5 10 15	
tta ggt caa tta ctc ggg gtg tgt acc aca aat gct ctg gcg aga gtg	97
Leu Gly Gln Leu Leu Gly Val Cys Thr Thr Asn Ala Leu Ala Arg Val	
20 25 30	
atg ctt gga agg agg gta ttc ggc gat ggg agc ggc gta gat cct	145
Met Leu Gly Arg Arg Val Phe Gly Asp Gly Ser Gly Gly Val Asp Pro	
35 40 45	
cag gcg gac gag ttc aaa tcc atg gtg gtg gaa atc atg gtg ttg gcc	193
Gln Ala Asp Glu Phe Lys Ser Met Val Val Glu Ile Met Val Leu Ala	
50 55 60	
ggc gcg ttt aat cta ggt gat ttt att ccc gct ctt gat tgg ttc gat	241
Gly Ala Phe Asn Leu Gly Asp Phe Ile Pro Ala Leu Asp Trp Phe Asp	
65 70 75 80	
ctg cag gga att acg gca aaa atg aag aaa gtt cac gct cgt ttc gat	289
Leu Gln Gly Ile Thr Ala Lys Met Lys Lys Val His Ala Arg Phe Asp	
85 90 95	
gcg ttc tta gac gcg atc ctt gag gag cac aaa tcc aac ggc tct cgc	337
Ala Phe Leu Asp Ala Ile Leu Glu His Lys Ser Asn Gly Ser Arg	
100 105 110	
gga gct aag caa cac gtt gac ttg ctg agt atg ttg atc tcc ctt caa	385
Gly Ala Lys Gln His Val Asp Leu Leu Ser Met Leu Ile Ser Leu Gln	
115 120 125	
gat aat aac att gat ggt gaa agt ggc gcc aaa ctc act gat aca gaa	433
Asp Asn Asn Ile Asp Gly Glu Ser Gly Ala Lys Leu Thr Asp Thr Glu	
130 135 140	
atc aaa gct ttg ctt ctg aac ttg ttc acg gct gga aca gac acg tca	481
Ile Lys Ala Leu Leu Asn Leu Phe Thr Ala Gly Thr Asp Thr Ser	
145 150 155 160	
tca agt act gtg gag tgg gca atc gca gag cta atc cga aac cca gaa	529
Ser Ser Thr Val Glu Trp Ala Ile Ala Glu Leu Ile Arg Asn Pro Glu	
165 170 175	
gta ttg gtt caa gcc caa caa gag ctc gat aga gta gtt ggg cca agt	577
Val Leu Val Gln Ala Gln Gln Glu Leu Asp Arg Val Val Gly Pro Ser	
180 185 190	
cgt ctt gtg acc gaa tct gat ctg cct caa ttg gca ttc ctt caa gct	625
Arg Leu Val Thr Glu Ser Asp Leu Pro Gln Leu Ala Phe Leu Gln Ala	
195 200 205	
gtc atc aaa gag act ttc aga ctt cat cca tcc act cca ctc tct ctt	673

Val Ile Lys Glu Thr Phe Arg Leu His Pro Ser Thr Pro Leu Ser Leu				
210	215	220		
cca cga atg gct tca gag ggt tgt gaa atc aat gga tac tcc atc cca				721
Pro Arg Met Ala Ser Glu Gly Cys Glu Ile Asn Gly Tyr Ser Ile Pro				
225	230	235	240	
aag ggt tcg aca ttg ctc gtt aac gta tgg tcc ata gcc cgt gat cct				769
Lys Gly Ser Thr Leu Leu Val Asn Val Trp Ser Ile Ala Arg Asp Pro				
245	250	255		
agt ata tgg gcc gac cca tta gaa ttt agg ccg gca cgt ttc ttg ccc				817
Ser Ile Trp Ala Asp Pro Leu Glu Phe Arg Pro Ala Arg Phe Leu Pro				
260	265	270		
ggc gga gaa aag ccc aat gtt gat gtg aga ggc aat gat ttt gag gtc				865
Gly Gly Glu Lys Pro Asn Val Asp Val Arg Gly Asn Asp Phe Glu Val				
275	280	285		
ata cca ttt ggt gct gga cgt agg ata tgt gct gga atg agc ttg ggt				913
Ile Pro Phe Gly Ala Gly Arg Arg Ile Cys Ala Gly Met Ser Leu Gly				
290	295	300		
tta aga atg gtt caa ctt tcg aca gct act ttg gtt cat tcg ttt aat				961
Leu Arg Met Val Gln Leu Ser Thr Ala Thr Leu Val His Ser Phe Asn				
305	310	315	320	
tgg gat ttg ctg aat ggg atg agc cca gat aaa ctt gac atg gaa gaa				1009
Trp Asp Leu Leu Asn Gly Met Ser Pro Asp Lys Leu Asp Met Glu Glu				
325	330	335		
gct tat ggg ctt aca ttg caa cgg gct tca cct ttg att gtc cac cca				1057
Ala Tyr Gly Leu Thr Leu Gln Arg Ala Ser Pro Leu Ile Val His Pro				
340	345	350		
aag ccc agg ctt gct agc tct atg tat gtt aaa tga aattatgctg				1103
Lys Pro Arg Leu Ala Ser Ser Met Tyr Val Lys				
355	360			
tgcgataat tccttattta tagcaggaaa tgtcatttt aattatgtgt aatgttcttc				1163
taactttcga tggaagtgca aaacaagttt tattaaaaaa aaaaaaaaaa a				1214

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<212> PRT
<213> Lisianthus

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Leu Gly Gln Leu Leu Gly Val Cys Thr Thr Asn Ala Leu Ala Arg Val
20 25 30

Met Leu Gly Arg Arg Val Phe Gly Asp Gly Ser Gly Gly Val Asp Pro
 35 40 45
 Gln Ala Asp Glu Phe Lys Ser Met Val Val Glu Ile Met Val Leu Ala
 50 55 60
 Gly Ala Phe Asn Leu Gly Asp Phe Ile Pro Ala Leu Asp Trp Phe Asp
 65 70 75 80
 Leu Gln Gly Ile Thr Ala Lys Met Lys Lys Val His Ala Arg Phe Asp
 85 90 95
 Ala Phe Leu Asp Ala Ile Leu Glu Glu His Lys Ser Asn Gly Ser Arg
 100 105 110
 Gly Ala Lys Gln His Val Asp Leu Leu Ser Met Leu Ile Ser Leu Gln
 115 120 125
 Asp Asn Asn Ile Asp Gly Glu Ser Gly Ala Lys Leu Thr Asp Thr Glu
 130 135 140
 Ile Lys Ala Leu Leu Leu Asn Leu Phe Thr Ala Gly Thr Asp Thr Ser
 145 150 155 160
 Ser Ser Thr Val Glu Trp Ala Ile Ala Glu Leu Ile Arg Asn Pro Glu
 165 170 175
 Val Leu Val Gln Ala Gln Glu Leu Asp Arg Val Val Gly Pro Ser
 180 185 190
 Arg Leu Val Thr Glu Ser Asp Leu Pro Gln Leu Ala Phe Leu Gln Ala
 195 200 205
 Val Ile Lys Glu Thr Phe Arg Leu His Pro Ser Thr Pro Leu Ser Leu
 210 215 220
 Pro Arg Met Ala Ser Glu Gly Cys Glu Ile Asn Gly Tyr Ser Ile Pro
 225 230 235 240
 Lys Gly Ser Thr Leu Leu Val Asn Val Trp Ser Ile Ala Arg Asp Pro
 245 250 255
 Ser Ile Trp Ala Asp Pro Leu Glu Phe Arg Pro Ala Arg Phe Leu Pro
 260 265 270
 Gly Gly Glu Lys Pro Asn Val Asp Val Arg Gly Asn Asp Phe Glu Val
 275 280 285
 Ile Pro Phe Gly Ala Gly Arg Arg Ile Cys Ala Gly Met Ser Leu Gly
 290 295 300
 Leu Arg Met Val Gln Leu Ser Thr Ala Thr Leu Val His Ser Phe Asn
 305 310 315 320
 Trp Asp Leu Leu Asn Gly Met Ser Pro Asp Lys Leu Asp Met Glu Glu
 325 330 335
 Ala Tyr Gly Leu Thr Leu Gln Arg Ala Ser Pro Leu Ile Val His Pro
 340 345 350
 Lys Pro Arg Leu Ala Ser Ser Met Tyr Val Lys
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 Met Asp Tyr Val Asn Ile Leu
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 ctg gga ctg ttt ttc act tgg ttc ttg gtg aat gga ctc atg tca ctt 103
 Leu Gly Leu Phe Phe Thr Trp Phe Leu Val Asn Gly Leu Met Ser Leu
 10 15 20

 cga aga aga aaa atc tct aag aaa ctt cca cca ggt cca ttt cct ttg 151
 Arg Arg Arg Lys Ile Ser Lys Lys Leu Pro Pro Gly Pro Phe Pro Leu
 25 30 35

 cct atc atc gga aat ctt cac tta ctt ggt aat cat cct cac aaa tca 199
 Pro Ile Ile Gly Asn Leu His Leu Leu Gly Asn His Pro His Lys Ser
 40 45 50 55

 ctt gct caa ctt gca aaa att cat ggt cct att atg aat ctc aaa tta 247
 Leu Ala Gln Leu Ala Lys Ile His Gly Pro Ile Met Asn Leu Lys Leu
 60 65 70

 ggc caa cta aac aca gtg gtc att tca tca tca gtc gtg gca aga gaa 295
 Gly Gln Leu Asn Thr Val Val Ile Ser Ser Val Val Ala Arg Glu
 75 80 85

 gtc ttg caa aaa caa gac tta aca ttt tcc aat agg ttt gtc ccg gac 343
 Val Leu Gln Lys Gln Asp Leu Thr Phe Ser Asn Arg Phe Val Pro Asp
 90 95 100

 gta gtc cat gtc cga aat cac tcc gat ttt tct gtt gtt tgg tta cca 391
 Val Val His Val Arg Asn His Ser Asp Phe Ser Val Val Trp Leu Pro
 105 110 115

 gtc aat tct cga tgg aaa acg ctt cgc aaa atc atg aac tct agc atc 439
 Val Asn Ser Arg Trp Lys Thr Leu Arg Lys Ile Met Asn Ser Ser Ile
 120 125 130 135

 ttt tct ggt aac aag ctt gat ggt aat caa cat ctg agg tct aaa aag 487
 Phe Ser Gly Asn Lys Leu Asp Gly Asn Gln His Leu Arg Ser Lys Lys
 140 145 150

 gtc caa gag tta att gat tat tgt caa aag tgt gcc aag aat ggc gaa 535
 Val Gln Glu Leu Ile Asp Tyr Cys Gln Lys Cys Ala Lys Asn Gly Glu
 155 160 165

 gca gtg gat ata gga aga gca act ttt gga act act ttg aat ttg cta 583
 Ala Val Asp Ile Gly Arg Ala Thr Phe Gly Thr Thr Leu Asn Leu Leu
 170 175 180

 tcc aac acc att ttc tct aaa gat ttg act aat ccg ttt tct gat tct 631
 Ser Asn Thr Ile Phe Ser Lys Asp Leu Thr Asn Pro Phe Ser Asp Ser
 185 190 195

 gct aaa gag ttt aag gaa ttg gtt tgg aac att atg gtt gag gct gga 679

Ala Lys Glu Phe Lys Glu Leu Val Trp Asn Ile Met Val Glu Ala Gly			
200	205	210	215
aaa ccc aat ttg gtg gac tac ttt cct ttc ctt gag aaa att gat ccg			727
Lys Pro Asn Leu Val Asp Tyr Phe Pro Phe Leu Glu Lys Ile Asp Pro			
220	225	230	
caa ggt ata aag cga cgc atg act aat aat ttt act aag ttt ctt ggc			775
Gln Gly Ile Lys Arg Arg Met Thr Asn Asn Phe Thr Lys Phe Leu Gly			
235	240	245	
ctt atc agc ggt ttg att gat gac cgg tta aag gaa agg aat cta agg			823
Leu Ile Ser Gly Leu Ile Asp Asp Arg Leu Lys Glu Arg Asn Leu Arg			
250	255	260	
gac aat gca aat att gat gtt tta gac gcc ctt ctc aac att agc caa			871
Asp Asn Ala Asn Ile Asp Val Leu Asp Ala Leu Leu Asn Ile Ser Gln			
265	270	275	
gag aac cca gaa gag att gac agg aat caa atc gag cag ttg tgt ctg			919
Glu Asn Pro Glu Glu Ile Asp Arg Asn Gln Ile Glu Gln Leu Cys Leu			
280	285	290	295
gac ttg ttt gca gca ggg act gat act aca tcg aat acc ttg gag tgg			967
Asp Leu Phe Ala Ala Gly Thr Asp Thr Ser Asn Thr Leu Glu Trp			
300	305	310	
gca atg gca gaa cta ctt cag aat cca cac aca ttg cag aaa gca caa			1015
Ala Met Ala Glu Leu Leu Gln Asn Pro His Thr Leu Gln Lys Ala Gln			
315	320	325	
gaa gaa ctt gca caa gtc att ggt aaa ggc aaa caa gta gaa gaa gca			1063
Glu Glu Leu Ala Gln Val Ile Gly Lys Gly Lys Gln Val Glu Glu Ala			
330	335	340	
gat gtt gga cga cta cct tac ttg cga tgc ata gtg aaa gaa acc tta			1111
Asp Val Gly Arg Leu Pro Tyr Leu Arg Cys Ile Val Lys Glu Thr Leu			
345	350	355	
cga ata cac cca gcg gct cct ctc tta att cca cgt aaa gtg gag gaa			1159
Arg Ile His Pro Ala Ala Pro Leu Leu Ile Pro Arg Lys Val Glu Glu			
360	365	370	375
gac gtt gag ttg tct acc tat att att cca aag gat tca caa gtt cta			1207
Asp Val Glu Leu Ser Thr Tyr Ile Ile Pro Lys Asp Ser Gln Val Leu			
380	385	390	
gtg aac gta tgg gca att gga cgc aac tct gat cta tgg gaa aat cct			1255
Val Asn Val Trp Ala Ile Gly Arg Asn Ser Asp Leu Trp Glu Asn Pro			
395	400	405	
ttg gtc ttt aag cca gaa agg ttt tgg gag tca gaa ata gat atc cga			1303
Leu Val Phe Lys Pro Glu Arg Phe Trp Glu Ser Glu Ile Asp Ile Arg			
410	415	420	

ggt cga gat ttt gaa ctc att cca ttt ggt gct ggt cga aga att tgc 1351
Gly Arg Asp Phe Glu Leu Ile Pro Phe Gly Ala Gly Arg Arg Ile Cys
425 430 435

cct gga ttg cct ttg gct atg agg atg att cca gta gca cta ggt tca 1399
Pro Gly Leu Pro Leu Ala Met Arg Met Ile Pro Val Ala Leu Gly Ser
440 445 450 455

ttg cta aac tca ttt aat tgg aaa cta tat ggt gga att gca cct aaa 1447
Leu Leu Asn Ser Phe Asn Trp Lys Leu Tyr Gly Gly Ile Ala Pro Lys
460 465 470

gat ttg gac atg cag gaa aag ttt ggc att acc ttg gcg aaa gcc caa 1495
Asp Leu Asp Met Gln Glu Lys Phe Gly Ile Thr Leu Ala Lys Ala Gln
475 480 485

cct ctg cta gct atc cca act ccc ctg tag ctatagggat aaattaagtt 1545
Pro Leu Leu Ala Ile Pro Thr Pro Leu
490 495

gaggttttaa gttacttagta gattctattg cagctatagg atttctttca ccatcacgta 1605
tgctttaccg ttggatgatg gaaagaaaata tctatagctt tggtttgtt tagttgcac 1665
ataaaaattg aatgaatgga ataccatgga gttataagaa ataataagac tatgattctt 1725
accctacttg aacaatgaca tggctatttc ac 1757

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<212> PRT
<213> Petunia sp.

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Val Asn Gly Leu Met Ser Leu Arg Arg Arg Lys Ile Ser Lys Lys Leu
20 25 30
Pro Pro Gly Pro Phe Pro Leu Pro Ile Ile Gly Asn Leu His Leu Leu
35 40 45
Gly Asn His Pro His Lys Ser Leu Ala Gln Leu Ala Lys Ile His Gly
50 55 60
Pro Ile Met Asn Leu Lys Leu Gly Gln Leu Asn Thr Val Val Ile Ser
65 70 75 80
Ser Ser Val Val Ala Arg Glu Val Leu Gln Lys Gln Asp Leu Thr Phe
85 90 95
Ser Asn Arg Phe Val Pro Asp Val Val His Val Arg Asn His Ser Asp
100 105 110
Phe Ser Val Val Trp Leu Pro Val Asn Ser Arg Trp Lys Thr Leu Arg
115 120 125
Lys Ile Met Asn Ser Ser Ile Phe Ser Gly Asn Lys Leu Asp Gly Asn
130 135 140

Gln His Leu Arg Ser Lys Lys Val Gln Glu Leu Ile Asp Tyr Cys Gln
 145 150 155 160
 Lys Cys Ala Lys Asn Gly Glu Ala Val Asp Ile Gly Arg Ala Thr Phe
 165 170 175
 Gly Thr Thr Leu Asn Leu Leu Ser Asn Thr Ile Phe Ser Lys Asp Leu
 180 185 190
 Thr Asn Pro Phe Ser Asp Ser Ala Lys Glu Phe Lys Glu Leu Val Trp
 195 200 205
 Asn Ile Met Val Glu Ala Gly Lys Pro Asn Leu Val Asp Tyr Phe Pro
 210 215 220
 Phe Leu Glu Lys Ile Asp Pro Gln Gly Ile Lys Arg Arg Met Thr Asn
 225 230 235 240
 Asn Phe Thr Lys Phe Leu Gly Leu Ile Ser Gly Leu Ile Asp Asp Arg
 245 250 255
 Leu Lys Glu Arg Asn Leu Arg Asp Asn Ala Asn Ile Asp Val Leu Asp
 260 265 270
 Ala Leu Leu Asn Ile Ser Gln Glu Asn Pro Glu Glu Ile Asp Arg Asn
 275 280 285
 Gln Ile Glu Gln Leu Cys Leu Asp Leu Phe Ala Ala Gly Thr Asp Thr
 290 295 300
 Thr Ser Asn Thr Leu Glu Trp Ala Met Ala Glu Leu Leu Gln Asn Pro
 305 310 315 320
 His Thr Leu Gln Lys Ala Gln Glu Glu Leu Ala Gln Val Ile Gly Lys
 325 330 335
 Gly Lys Gln Val Glu Glu Ala Asp Val Gly Arg Leu Pro Tyr Leu Arg
 340 345 350
 Cys Ile Val Lys Glu Thr Leu Arg Ile His Pro Ala Ala Pro Leu Leu
 355 360 365
 Ile Pro Arg Lys Val Glu Glu Asp Val Glu Leu Ser Thr Tyr Ile Ile
 370 375 380
 Pro Lys Asp Ser Gln Val Leu Val Asn Val Trp Ala Ile Gly Arg Asn
 385 390 395 400
 Ser Asp Leu Trp Glu Asn Pro Leu Val Phe Lys Pro Glu Arg Phe Trp
 405 410 415
 Glu Ser Glu Ile Asp Ile Arg Gly Arg Asp Phe Glu Leu Ile Pro Phe
 420 425 430
 Gly Ala Gly Arg Arg Ile Cys Pro Gly Leu Pro Leu Ala Met Arg Met
 435 440 445
 Ile Pro Val Ala Leu Gly Ser Leu Leu Asn Ser Phe Asn Trp Lys Leu
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 Tyr Gly Gly Ile Ala Pro Lys Asp Leu Asp Met Gln Glu Lys Phe Gly
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